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(54) Method for coating vaporising chambers of steam-ironing devices

(57) Vaporising chambers of steam-ironing devices are coated by application of an aqueous composition comprising a mixture of sodium water glass solution with a molar ratio SiO_2/Na_2O between 3.0 and 3.4 and a SiO_2 concentration between 22 and 28% by weight and magnesium hydroxide between 100:15 and 100:24. The coating prevents the Leidenfrost's phenomenon when the water droplets strike upon the hot surface of the vaporising chamber and is durable and temperature-change stable and should possess a good sprayable consistency and be capable of storage for at least several weeks in closed vessels.

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SPECIFICATION

Method for coating vaporising chambers of steam-ironing devices

The invention relates to a method for coating vaporising chambers in steam-ironing devices.

Steam-ironing devices possess a heatable so-called vaporising chamber in which water entering in droplets is vaporised. As is known however water droplets striking upon hot metal surfaces do not vaporise uniformly and in trouble-free manner, but conglomerations, splashing around and sizzling are observed, known as Leidenfrost's phenomenon. This leads to troubles in steam-ironing. Parts of the water droplets are entrained by the steam and driven through the steam outlet openings, so that the undesired and troublesome "spitting" or "splashing" occur. In order to eliminate or reduce these disadvantages, the metallic surface of the vaporising chamber is provided with a coating.

By way of example hydrate of alumina (aluminium hydroxides or aluminium oxides) with small additions for example of acetic acid or especially of silicate materials are known as coating materials on an inorganic basis. Silicate coating materials can be produced on the basis either of silica brines or of alkali silicate solutions. While a pure sodium silicate coating permits working temperatures of the ironing device only up to 171°C, it is sought to improve the properties of the coating by means of suitable additions of solids, such as glass powder of specific granulation or granulation distribution or hydrate of alumina. Thus one method of producing coatings for vaporising chambers of steam-ironing devices (Pub.Sp. 1,785,332) is known in which a mixture of a sodium-water-glass solution with a molar ratio $SiO_2/Na_2O = 3.5$, preferably 3.75, and hydrate of alumina in a mass ratio 100 : 8 is applied to the surface concerned.

It is disadvantageous that according to the quantity of hydrate of alumina added, a more or less great increase of viscosity of the mixture is achieved so that the latter can no longer be applied by spraying but only by brush or spatula application etc. The disadvantage consists here in that this application technology is disadvantageous in comparison with spray application and it is more difficult to maintain the expedient thickness for coating, here lying between 20 and 50 μm, or this thickness can be maintained only inaccurately, and thus the durability is negatively influenced. A reduction of the proportion of alumina reduces the firmness of adhesion and the coating tends to flake away.

It is the aim of the invention to find an economically favourable method for a durable and temperature-change-stable coating of the vaporising chamber in steam-ironing devices which is easily reproducible and prevents the occurrence of Leidenfrost's phenomenon. The coating medium should possess a good sprayable consistency and be capable of storage in closed vessels for at least several weeks.

The invention is based upon the problem of developing a method for the production of a uniform, durable and temperature-change-stable coating of the vaporising chamber in steam-ironing devices and of guaranteeing the durability of adhesion of the coating even at 400°C. and above.

According to the invention the problem is solved in that a mixture of a sodium-water-glass solution with a molar ratio $SiO_2/Na_2O = 3.0$ to 3.4 and an SiO_2 concentration between 22 and 28% by mass and magnesium hydroxide of good crystalline structure is used in the mass ratio sodium-water-glass solution : magnesium hydroxide between 100 : 15 and 100 : 24, and this mixture can contain up to 9% by mass of other additives such for example as pigments and fillers. This mixture is dispersed for about 5 hours in a ball mill and applied by spraying to a substratum surface, which is unheated or favourably heated to 170 to 250°C, in a layer thickness of approximately 30 to 80 μm by spraying. The most expedient coating thickness is determined *inter alia* according to the design properties of the entire vaporising chamber and the mean working temperatures in steam working.

In the case of application of the coating material to the cold substratum surface a thermal subsequent hardening is necessary at 170 – 250°C. If the material is sprayed on to the heated metal surface, it may be possible to omit a thermal subsequent hardening.

The advantages consist in the capacity of resistance of the coating to cold and hot water and steam, in the excellent firmness of adhesion, even at temperatures up to 400°C. and above, high temperature change stability and in that the coating is not destroyed in the case of overheating and dry operation of the steam-ironing apparatus.

Water droplets striking upon the coated surface are distributed uniformly and at the working temperature of the sole of the iron up to at least 250°C., the Leidenfrost's phenomenon is reliably prevented.

The coating material despite its high proportion of solids possesses a good sprayable consistency and can be produced in an easily reproducible manner. It can be stored for at least several weeks without modification of properties in closed vessels.

A coating material, consisting of

100 g. sodium water-glass solution (molar ratio SiO_2/Na_2O + 3.2, SiO_2 concentration 26% by mass),

21 g. magnesium hydroxide of good crystalline structure and

3 g. light blue pigment

is dispersed for about 5 hours in a ball mill

and applied by spraying to the vaporising chamber surface of an iron sole heated previously to 220°C., in a coating thickness of about 30 to 60 μm. Then subsequent hardening can be effected for about a further hour at about 200°C.

CLAIMS

1. Method for coating vaporising chambers in steam-ironing devices on the basis of aqueous alkali silicate solutions, characterised in that a mixture of sodium-water-glass solution with a molar ratio SiO_2/Na_2O between 3.0 and 3.4, and SiO_2 concentration between 22 and 28% by mass and magnesium hydroxide of good crystalline structure, in the mass ratio alkali silicate solution : magnesium hydroxide between 100 : 15 and 100 : 24, is applied to the substratum surface.

2. Method according to Claim 1, characterised in that the mixture can contain up to 9% by mass of other additives such as pigments, fillers and the like.

3. Method according to Claims 1 and 2, characterised in that the coating medium is applied to the substratum surface which is previously heated to 170° to 250°C.

4. Method according to Claims 1 to 3, characterised in that the coating can be thermally after-treated.

5. Method for coating vaporising chambers of steam-ironing devices substantially as described herein with reference to the accompanying drawings.

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